EOSDIS
NASA'S EARTH OBSERVING SYSTEM
DATA AND INFORMATION SYSTEM

Using UMM-Var and E2E To Improve The User Experience for Accessing NASA EOSDIS Data Sets

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Outline

I. Introduction To UMM-Var
II. E2E Capability and End-User Experience
III. Demo of E2E Capability in Earthdata Search

I. Introduction To UMM-Var

What is the UMM-Var?

The Unified Metadata Model for Variables (UMM-Var) describes variable-level metadata. UMM-Var provides a higher level of specificity about the data than collections, and allows search and discovery of data at the variable level using community-sourced terms.

- Enables services at the variable level, as an extension to the UMM-C (Collections) and UMM-G (Granules) metadata models.
- Permits users to search and discover variables via well known geophysical terms (a.k.a. measurement names), as well as using existing Science Keywords.

Measurement: An observable property, usually geophysical. For models, it is a simulated observable property. Measurement Names are of the form: <object>__<quantity>. Names shall contain only lowercase letters and numbers along with the Standard Names separator characters (_, -, ~, __).

Examples:

"**land_surface_air_flow**",
"**land_surface_air_heat**-incoming-latent",
"**land_surface_air**-incoming-sensible",

Variable: A measured geophysical quantity associated with a particular data product, typically a point, swath or grid of values nested within the data file. One or more variables may be associated with a given collection.

Examples:

psl (mean sea level pressure)
O3_ppbv (ozone mixing ratio reported in parts per billion by volume)
Scat_550 (total dry aerosol scattering coefficient at 550 nm)

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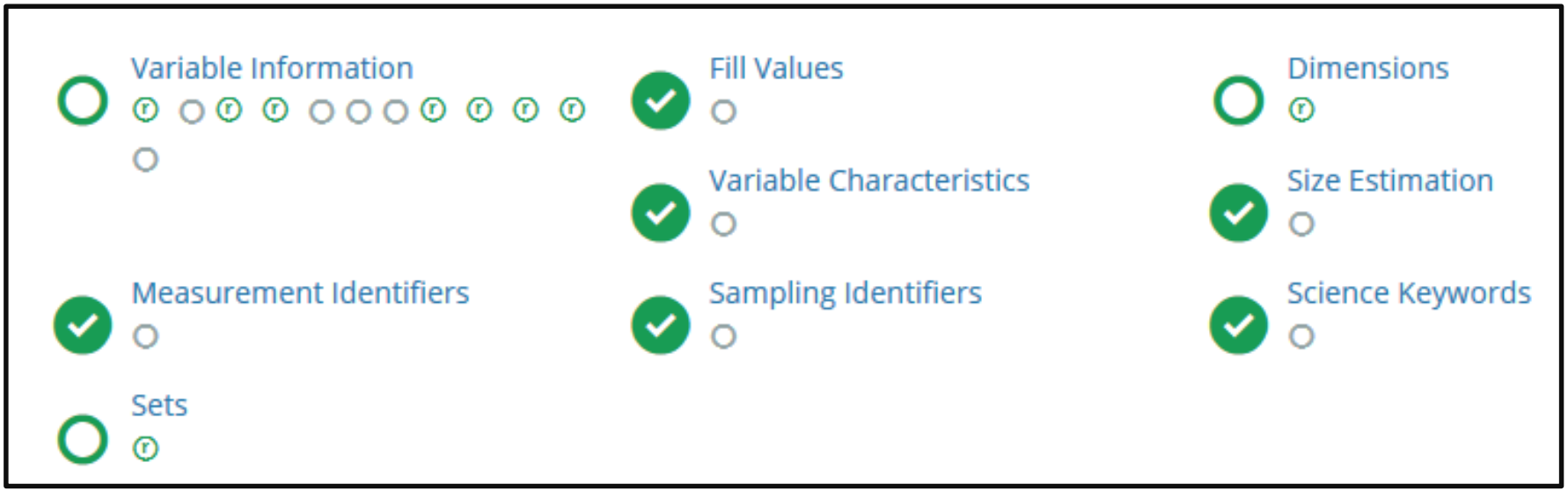
Fields in UMM-Var

This view highlights the top-level fields in the UMM-Var.



What Does a Provider Need to Know About UMM-Var?

- **UMM-Var Version 1.5**
  - Updated the use case for Size Estimation Service.
  - Updated to support Size Estimation Service with better specification of data formats (via an enumeration) and a few fixes.
  - Improvements following the Goddard Earth Sciences (GES) Data and Information Services Center (DISC) pathfinder work resulted in a refinement of the implementation of Variable uniqueness; added AcquisitionSourceName.
- **UMM-Var Metadata Curation**
  - Records can be curated using the UMM-Var Generation (UVG) script.
  - Records can be curated using the Metadata Management Tool (MMT).
  - Records can be curated using the Common Metadata Repository (CMR) API.
  - Records can be associated to a related collection record.
- **UMM-Var Documentation**
  - Access the model and associated documentation at https://wiki.earthdata.nasa.gov/display/CMR/CMR+Documents.

II. End-To-End Service (E2E) Capability and End-User Experience

End-to-End Services (E2E) Capability

- Enables users to apply data transformations to data sets at the variable level.
- Requires both UMM-S and UMM-Var records to be present in CMR.
  - A UMM-S record is associated with all relevant UMM-C records.
  - The Service Options class in UMM-S provides a means to define the data transformations options available via a specific service.
- In Earthdata search, the service options show up for each of the variables within a collection.
- E2E goes beyond the traditional “order and download”. paradigm and offers a more enhanced way to retrieve data.

What Does a Provider Need To Do to Add E2E Capabilities To Their Records?

- **Update UMM-S Records**
  - Curate record using the MMT or CMR API.
  - Add ServiceOptions to services, showing data transformations available, e.g. via OPeNDAP, THREDDS, WMS services (Note: E2E currently supports OPeNDAP only).
  - Add service to collection associations via MMT or the CMR API.

- **Update UMM-Var Records**
  - Use the UVG script to generate all the needed variable records.
  - By default, UVG adds variable–collection associations via the CMR API at the time of variable generation.
  - Manually curate records post-generation using the MMT or CMR API (note: there are ongoing improvements to the UVG script based on provider testing).

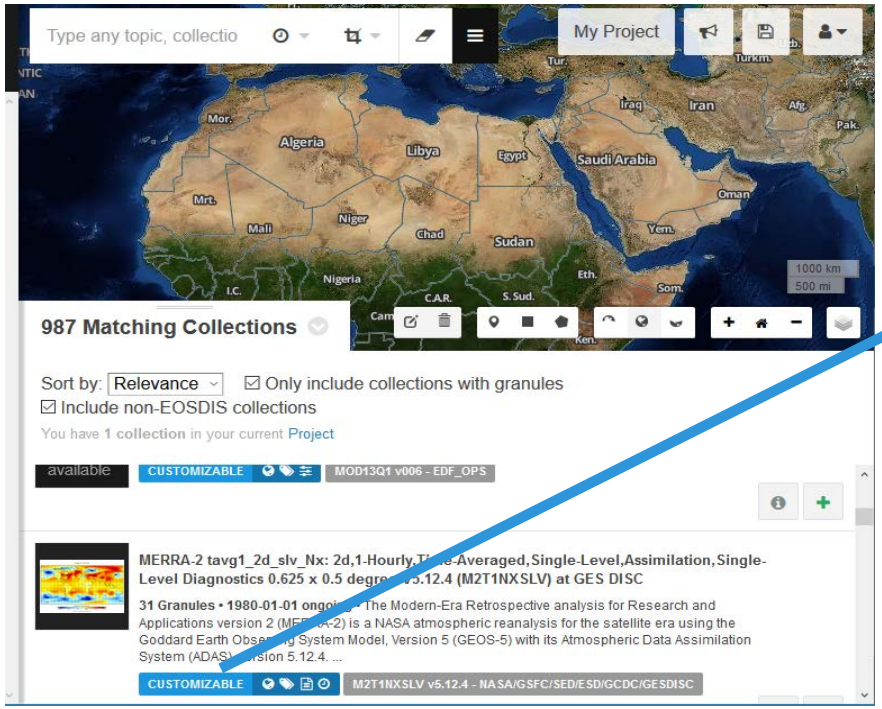
E2E Documentation

- Existing collection with ***new services***:
  - https://wiki.earthdata.nasa.gov/x/OhDZBw
- ***New collection*** capable of services:
  - https://wiki.earthdata.nasa.gov/x/NRDZBw
- How To: Configure Customizable Icons:
  - https://wiki.earthdata.nasa.gov/x/9ZsYC
- UMM-S Curators Guide
  - https://wiki.earthdata.nasa.gov/x/agFHC

User Experience in Earthdata Search

Collection Search

Search for collection in Earthdata Search (https://search.uat.earthdata.nasa.gov/).



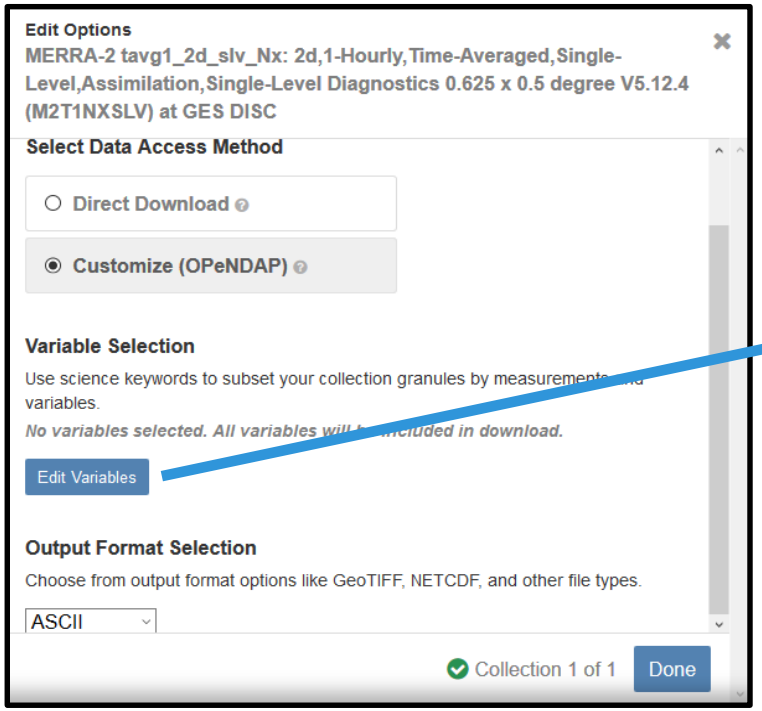
Customizable Badge

The Customizable badge is displayed to highlight that spatial, variable, reformatting, and temporal subsetting options are available on a given collection. These options are set in the UMM-Var metadata.

User Experience in Earthdata Search

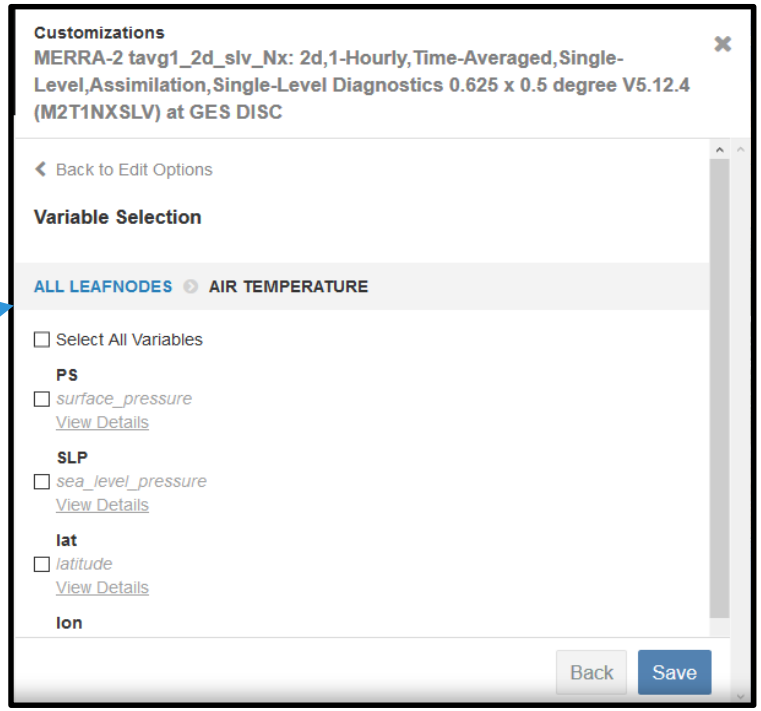
Project Page

You can customize your data access and subsetting options.



Variable Selection

Select specific variables for a given collection.



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III. Demo of E2E Capability in Earthdata Search

Demo of E2E Capability in Earthdata Search

User Scenario:

I am looking for soil moisture data from SMAP in the Washington State region and want to reformat and download the data so I can use the data in a downloadable tool that supports HDF formatted data.

Thank You

- If you have any questions, please reach out to me (Tyler.B.Stevens@nasa.gov) or Valerie Dixon (Valerie.dixon@nasa.gov)

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